The Influence of Sucrose & it's Effects on the Growth Rate of Mold, & the *Arabidopsis thaliana* Plant

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Introduction

Sucrose, a plant sugar, is one of the main products of photosynthesis as it helps to promote floral transition in many plant species. Media with sucrose can also be used to grow plants for research. High concentrations of sucrose will cause an increase in the number of leaves at the time of flowering in the *Arabidopsis thaliana* plant. Sucrose is transported from the leaves via the phloem in order to provide the rest of the plant with carbon and energy for growth and storage product synthesis. In nature, plants and fungi can compete directly for sucrose and other soil nutrients. It is hypothesized that an increase in fungal growth will result from plating *Arabidopsis thaliana* seeds on MS agar with added Sucrose.

Methods

Arabidopsis thaliana seeds were either stratified or unstratified. Seeds can be stratified with bleach because this will simulate the natural conditions a seed must endure before germination. *Murashige-Skoog agar* with sucrose and without sucrose was prepared. The number of mold colonies, the type of mold species, and the amount of mold growth was measured every week.

Number of Plates	*Arabidopsis thaliana Seeds*	Sucrose Added
3	No seeds	No
3	No seeds	Yes
3	Stratified seeds	No
3	Stratified seeds	Yes
3	Unstratified seeds	No
3	Unstratified seeds	Yes

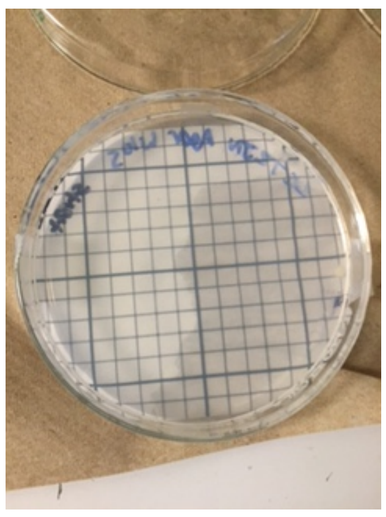


Figure 1: Grid created on the bottom of each petri dish.

Figure 2: Agar with no sucrose and stratified seeds. Shown at Day 60.

Figure 3: Agar with sucrose and stratified seeds. Shown at Day 60.

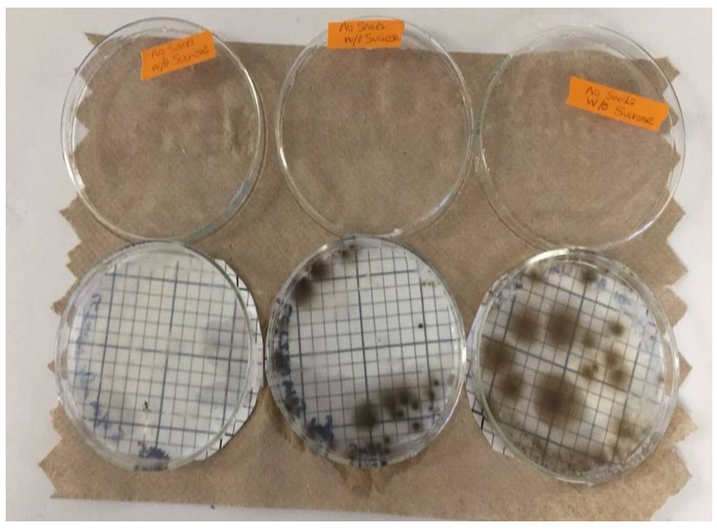


Figure 4: Agar with no Sucrose and no seeds. Shown at Day 60.

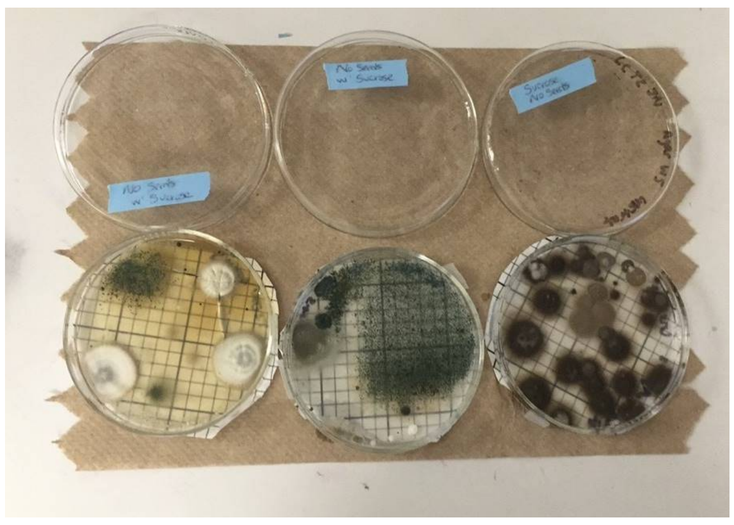
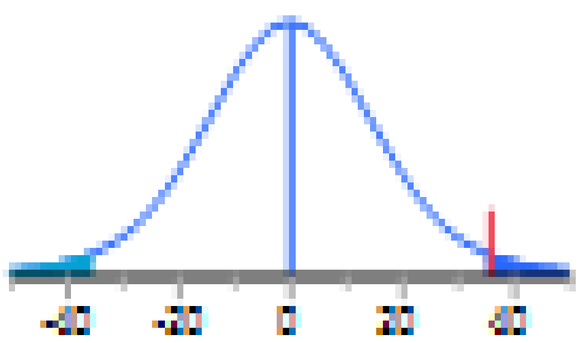
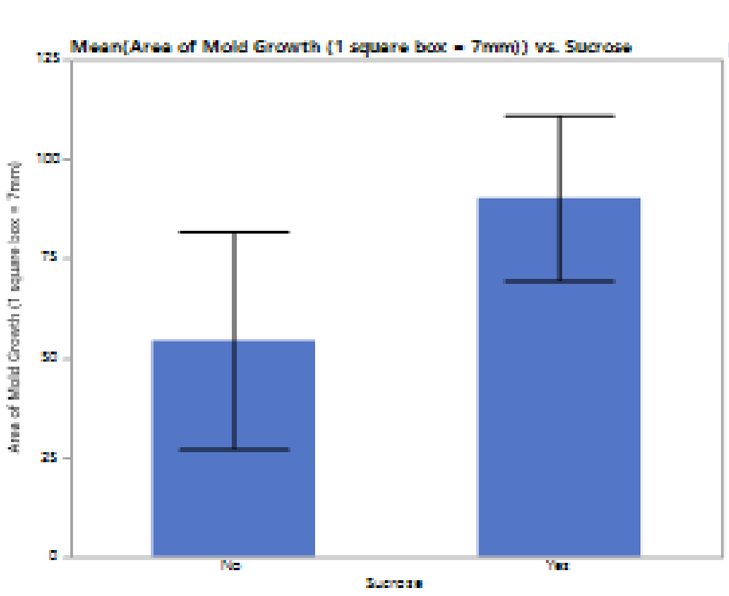


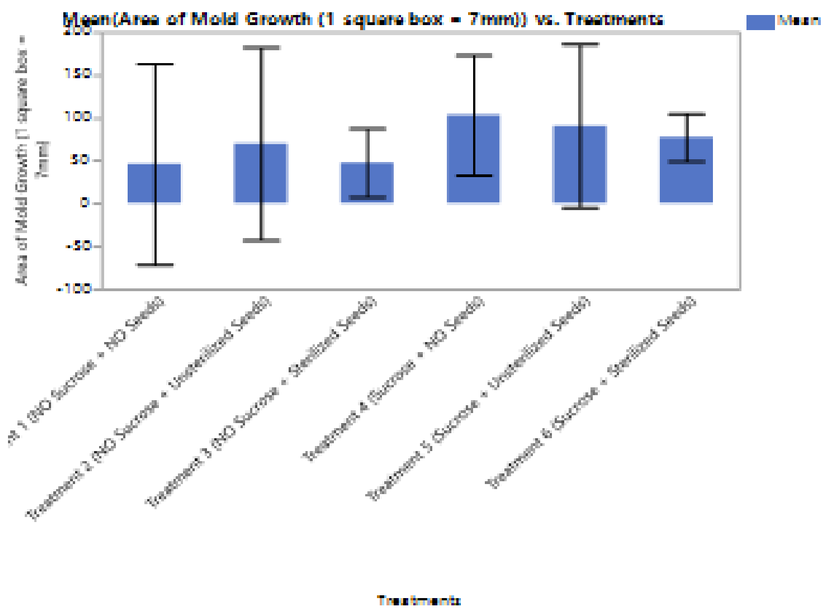
Figure 5: Agar with Sucrose added and no seeds. Shown at Day 60.



Graph 1: T-test of Sucrose vs Non-Sucrose. The p-value is 0.0288 and is less than the significance level of 0.05.



Graph 2: Bar chart of the area of mold growth in the presence of sucrose or not**.** Each error bar is constructed using a 95% confidence interval of the mean.



Graph 3: Area of mold growth in the presence or not of sucrose by each of the 6 treatments. Each error bar is constructed using a 95% confidence interval of the mean.

Results

- The Agar with sucrose and no seeds had more mold growth than the Agar with no sucrose and no seeds.
- The Agar with no sucrose showed a lot of plant growth compared to the Agar with sucrose; sterilized & unsterilized seeds.
- The sterilized seeds exhibited more mold in the plates with sucrose than the sterilized seeds in the plates with no sucrose.
- The Agar with sucrose that contained unsterilized seeds had the highest number of mold colonies and mold species.
- Sucrose is a contributor to the growth of mold whether or not the *Arabidopsis thaliana* seeds are sterilized.

Conclusion

The results showed that the Agar without sucrose had more plant growth because sucrose is a sugar carbohydrate. The seeds that were not sterilized exhibited more mold than the seeds that were sterilized in the plants with no sucrose. When there were no added seeds, the agar with sucrose exhibited more mold growth than the Agar without sucrose because yeast is a fungus and needs a supply of energy for its living and growth; sugar supplies this energy. The more sugar there is, the more active the yeast will be and the faster its growth. Fungal contamination can destroy the product being tested within a lab. Also, if the fungal contamination is not detected and the product is released, it can be hazardous to consumer health. To avoid microbial contaminations, the testing environment should be prepared in such a way that decreases the chance for fungi to survive, grow and contaminate products. Incubators, light fixtures, and poorly ventilated areas or workspaces cause insufficient air flow and can lead to fungal growth and contamination.